



**MARKED UP VERSION OF CLAIMS WITH MARKING**

**TO SHOW CHANGES MADE**

1. (Original) A horticultural growing medium comprising:  
a flexible diphenylmethane diisocyanate foam material without filler material having a cation exchange capacity ranging from about 1.0 to about 1.5,  
said horticultural growing medium being capable of supporting plant growth.
2. (Original) The horticultural growing medium of claim 1, wherein said cation exchange capacity is about 1.25.
3. (Original) The horticultural growing medium of claim 1, wherein said diphenylmethane diisocyanate foam material is taken from a group consisting of polymeric diphenylmethane diisocyanate, crude diphenylmethane diisocyanate, 4,4'-, 2,4'-, 2,2'-diphenylmethane diisocyanate.
4. (Original) The horticultural growing medium of claim 1, wherein said diphenylmethane diisocyanate foam material is polymeric diphenylmethane diisocyanate.
5. (Original) The horticultural growing medium of claim 1, wherein said diphenylmethane diisocyanate foam material is one or a mixture of 2,2'-, 2,4'- and 4,4'-diphenylmethane diisocyanate (MDI), polymeric MDI, crude MDI, namely, products of crude diaminodiphenyl methane or a mixture of the same
6. (Original) The horticultural growing medium of claim 1, wherein said foam material has a neutral pH ranging from 6.8 to 7.8.
7. (Original) The horticultural growing medium of claim 1, wherein said foam material is highly porous and maintains a 60 to 40 air to water ratio.

8. (Original) The horticultural growing medium of claim 1, wherein said foam material has at least 50% of its pores by foam volume ranging in size between 10 and 200 microns.

9. (Original) The horticultural growing medium of claim 1, wherein said foam material has about 50% of its pores by foam volume ranging in size from 40 to about 90 microns.

10. (Original) The horticultural growing medium of claim 1, wherein said foam material has pores ranging from 20% to about 25% by foam volume which range in size between about 0.2 microns to about 10 microns.

11. (Original) The horticultural growing medium of claim 1, wherein said foam material has pores ranging from about 25% to about 35% by foam volume which range in size between about 300 microns to about 800 microns.

12. (Original) The horticultural growing medium of claim 1, wherein said foam material is substantially sterile.

13. (Original) The horticultural growing medium of claim 1, wherein said foam material has pores of about 30% by foam volume which range in size between about 300 microns to about 800 microns.

14. (Original) The horticultural growing medium of claim 1 wherein said foam material has a total porosity ranging from 85% to 95%.

15. (Original) The horticultural growing medium of claim 1 wherein said foam material has a total porosity of about 90% to 92%.

16. (Previously Presented) A horticultural growing medium comprising:  
a sterile hydrophilic unfilled foam material made of diphenylmethane diisocyanate having at least 50% of its pores by foam volume ranging in size between 10 and 200 microns with a cation

exchange capacity ranging from about 1.0 to about 1.5, said foam material having a total porosity ranging from about 85% to about 95%;

said horticultural growing medium being capable of supporting plant growth.

17. (Original) The horticultural growing medium of claim 16, wherein said foam material is at least one diphenylmethane diisocyanate taken from a group consisting of crude, polymeric, 4,4'-, 2,4'- and 2,2'-diphenylmethane diisocyanate.

18. (Original) The horticultural growing medium of claim 16, wherein said foam material is polymeric diphenylmethane diisocyanate.

19. (Original) The horticultural growing medium of claim 16, wherein said foam material is one or more of 2,2'-, 2,4'- and 4,4'-diphenylmethane diisocyanate (MDI), crude MDI, polymeric MDI or a mixture of the same.

20. (Previously Presented) A horticultural growing medium comprising:

a substantially sterile unfilled foam material made of polymeric diphenylmethane diisocyanate taken from a group consisting of one or more of 2,2'-, 2,4'- and 4,4'-diphenylmethane diisocyanate (MDI), crude MDI, products of crude diaminodiphenyl methane including polymeric MDI or a mixture of the same, having at least 50 of its pores ranging in size between 10 and 200 microns with a cation exchange capacity ranging from about 1.0 to about 1.5, with a total porosity ranging from about 90% to about 92%,

said horticultural growing medium being capable of supporting plant growth.

21. (Original) A horticultural growing medium as claimed in claim 20 wherein said foam material is a sheet with seeds secured thereto.

22. (Original) A horticultural growing medium as claimed in claim 20 wherein said foam material is a shaped block with an aperture cut therein.

23. (Original) A horticultural growing medium as claimed in claim 20 wherein said cation exchange capacity is about 1.0.

24. (Canceled)

25. (Previously Presented) A horticultural growing medium comprising:

a hydrophilic, substantially sterile diphenylmethane diisocyanate foam material without filler material taken from a group consisting of polymeric diphenylmethane diisocyanate, crude diphenylmethane diisocyanate, 4,4'-, 2,4'-, 2,2'-diphenylmethane diisocyanate and having a neutral pH ranging from 6.8 to 7.8, said material having a cation exchange capacity ranging from about 1.0 to about 1.5,

said horticultural growing medium being capable of supporting plant growth.

26. (Previously Presented) A horticultural growing medium comprising:

a hydrophilic flexible sterile foam material made of diphenylmethane diisocyanate said foam material being taken from a group consisting of crude, polymeric, 4,4'-, 2,4'- and 2,2'-diphenylmethane diisocyanate having at least 50% of its pores by foam volume ranging in size between 10 and 200 microns with a cation exchange capacity ranging from about 1.0 to about 1.5, said foam material having a total porosity ranging from about 85% to about 95%;

said horticultural growing medium being capable of supporting plant growth.

## REMARKS

Applicant traverses the Examiner's rejection of claims 1-15 under 35 USC 103(a) as unpatentable over Pruitt U.S. Patent Number 2,988,441 in view of Garrett U.S. Patent Number 5,617,672. Applicant also traverses the Examiner's rejection of claims 16-23, 25 and 26 which have been rejected under 35 USC 103(a) as unpatentable over US Rubinate/Suprasec in view of Pruitt '441.

The Garrett '672 reference is directed toward a soil additive using a foam having a bulk density of approximately 1 pound per cubic foot can be dismissed in its entirety as it is directed to ureaformaldehyde foam. As noted on Col 4 lns 59-63: "Generally, the present invention is directed to a plant growth media comprising a ureaformaldehyde foam that can be used to control the growth rate of the plants or to decrease the growth rate of the plants" The foam in powdered form is added to a soil formulation such as natural soils, potting soil, peatlite, vermiculite, peat moss and mixtures thereof. Thus there is filler material under any interpretation of the specification. See Col. 7 lns 3,4 " \* \* \* , it is believed that when the foam is mixed with a soil, better aeration occurs." It is readily understood by one of ordinary skill in the art that ureaformaldehyde foam is made from reacting formaldehyde and urea and is totally different in composition and structure in relation to the unique polyurethane foam of the present invention. Garrett '672 also does not show any cation exchange capacity (hereinafter CEC ) for the material relying upon the organic composition of the mixture to provide same. It should be noted that Ureaformaldehyde foam has a residue (ppm) of formaldehyde remaining in the foam material. The examples only show the use of finely ground ureaformaldehyde foam as a filler with organic materials.

The Pruitt '441 reference is directed towards a medium for the growth and propagation of

potted plants using polyurethane, rubber and vinyl resins having added synthetic ion exchange resins to produce an open celled foam.

It would not be obvious to one of ordinary skill in the art at the time of the invention to modify the medium of Pruitt '441 by eliminating the filler because unfilled polyurethane foam is not hydrophilic nor does it have a CEC of from 1.0 to 1.5. To overcome an inherently poor CEC, Pruitt adds a synthetic anion exchange resin (col. 13, lns. 57-75) and adds an inert compound having a high water-holding capacity in order to render the matrix hydrophilic (See example 1).

In the present invention it was unexpected that the invented foam formulation would produce a hydrophilic foam with a CEC of from 1.0 to 1.5. As previously noted, Pruitt '441 is directed toward filled foams. Sterility is not inherent to filled foams nor is there any mention of sterility in Pruitt '441. Since the present invention does not introduce any fillers to the matrix, there is less possibility to contaminate the matrix and render it un-sterile. Sterile materials conform to Agricultural requirements current in place thus making it easier to ship plants and the media materials across national borders. Neither reference is a foam material with a CEC ranging from 1.0 to 1.5, has sterility which has been previously noted as a necessary requirement when shipping plants internationally or optimum pore sized for fluid transfer to the plant. It may be obvious to one of ordinary skill in the art that air water ratios can be altered with the addition of fillers, but it is not obvious how to obtain air water ratios without the use of fillers.

As previously noted the claim of pore size and porosity is a further description of the unique unfilled foam with unexpected properties.

One of ordinary skill in the art would realize that polyurethane foam cannot be made without an isocyanate being one of the ingredients. The present invention uses a unique unfilled

polyurethane foam with unexpected properties that support plant growth.

The invention of Pruitt is based on the additions of ion exchange additives. It is not obvious to one of ordinary skill in the art that polymeric diphenylmethane diisocyanate would impart the unique properties to the unfilled foam of the present invention.

As to Claims 16, 17, 19, 20 through 23, 25 and 26 Rubinate/Suprasec is only a list of isocyanates supplied by Huntsman and does not disclose **a sterile foam or that the foam can be used for plant growth**. Although Pruitt '441 discloses 4,4'-methylenebis(phenyl isocyanate), the use of this material in his invention of filled polyurethane foam would not produce a foam matrix with the unexpected unique properties of the present invention of a non-filled foam. Pruitt '441 does not disclose a CEC ranging from 1.0 to 1.5 and is directed toward a filled foam. There is no showing that if the foams were modified by Pruitt '441 that it would have a 1.0 to 1.5 CEC..

Pruitt (US 2,988,441 & US 3,373,009), Garrett (US 5,617,672), disclose in the prior art various growth media of foams, in which **all of the prior art, use filler in the growth media because un-filled polyurethane foam was not believed to be a suitable growth media. It was unexpected to discover that the un-filled polyurethane foam of the present invention has the required properties of a suitable growth media.**

In respect to the obvious 35 USC 103(a) rejection, as noted by the Court in the case of *In re Gordon*, the mere fact that a prior art reference could be modified to achieve the claimed invention does not make the modification obvious unless the prior art suggested the desirability of the modification. *In re Gordon*, 733 F.2d 900, 902, 221 U.S.P.Q. 1125, 1127 (Fed. Cir.1984); see also *In re Laskowski*, 871 F.2d 115, 117, 10 U.S.P.Q.2d 1397, 1398 (Fed. Cir. 1989), and *Ex parte Levengood*, 28 U.S.P.Q.2d 1300, 1302 (Bd. Pat. App. & Int. 1993). Applicants respectfully submit

that nowhere in the art of record is there any suggestion other than simple assertion by the Examiner engaging in hind site and creative speculation to arrive at the claimed structure of the present invention.

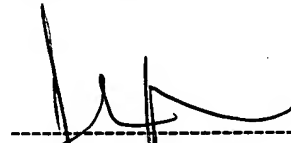
As previously noted, none of the cited references singularly or in combination teach or obviate the presently claimed invention.

If any additional charges are required, please charge Deposit Account Number 07-1340. A Notice of Appeal and Request for Three Month Extension along with a check for the same is attached.

It is respectfully requested that the arguments be reconsidered and that the application in condition for favorable reexamination and that the application be passed to issue.

Respectfully submitted,

GIPPLE & HALE

A handwritten signature in black ink, appearing to read 'John S. Hale', is written over a horizontal dashed line.

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